

**BEFORE THE  
FEDERAL COMMUNICATIONS COMMISSION  
WASHINGTON, DC 20554**

<b>In the Matter of</b>	)	
	)	
<b>Request by Progeny LMS, LLC</b>	)	<b>WT Docket No. 11-49</b>
<b>for Waiver of Certain Multilateration</b>	)	
<b>Location and Monitoring Service Rules</b>	)	

**To: The Federal Communications Commission**

**COMMENTS  
OF  
GE DIGITAL ENERGY AND GE MDS LLC**

GE Digital Energy and GE MDS LLC (“GE MDS”) submit these Comments in response to the Commission’s Public Notice requesting comment on the results of Joint M-LMS Field Testing Reports by Progeny LMS, LLC (“Progeny”).<sup>1</sup> As manufacturers of Part 15 equipment used by countless oil and gas companies, electric utilities and other industries for critical applications in the 902-928 MHz band, GE Digital Energy and GE MDS are extremely concerned that Progeny’s proposed system will cause harmful interference to millions of embedded devices that were purchased, installed and used in reliance upon the Commission’s existing rules. GE Digital Energy and GE MDS urge the Commission *not* to approve Progeny’s commencement of M-LMS operations without ensuring safeguards to protect Part 15 users from harmful interference.

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<sup>1</sup>See The Wireless Telecommunications Bureau and the Office of Engineering and Technology Seek Comment on Progeny’s Joint M-LMS Field Testing Reports, WT Docket No. 11-49, *Public Notice*, DA 12-1877 (WTB, OET rel. Nov. 20, 2012) (“Public Notice”).

## **I. Background**

### ***A. GE Digital Energy***

GE Digital Energy, a division of the General Electric Company, is a global leader in protection and control, communications, power sensing and power quality solutions. Our products and services - backed by a global team of more than 5,000 employees - increase the reliability of electrical power networks and critical equipment for utility, industrial and large commercial customers. From protecting and optimizing assets such as generators, transmission lines and motors, to ensuring secure wireless data transmission, GE Digital Energy delivers industry-leading technologies to solve the unique challenges of each customer.

GE Digital Energy also is a leading provider of smart metering solutions to improve utilities' operational efficiency and service quality, and enable consumers to better understand and manage energy usage. GE Digital Energy's smart meters are designed to operate with a variety of communications technologies, including wireless networks that operate in the unlicensed 902-928 MHz band. These solutions are designed to deliver near real-time instrumentation, dynamic pricing, power quality monitoring, and access to critical power usage data.

### ***B. GE MDS***

GE MDS, a wholly-owned subsidiary of the General Electric Company, is a leader in industrial wireless networking solutions with applications in the supervisory control and data acquisition ("SCADA"), automation, telecommunication, public safety, and online transactional market segments. GE MDS designs and manufactures networked high-speed point-to-multipoint and medium and low capacity point-to-point microwave radios that operate as Part 15 devices in license-exempt bands, notably the 902-928 MHz band. GE MDS's Part 15 devices are utilized

across a diverse range of industries and applications serving the nation’s critical infrastructure, including electric utilities, oil and natural gas, mining, public safety and even military operations.

## **II. The Commission’s M-LMS Service Rules Are Designed To Protect Part 15 Devices From Harmful Interference By Higher Power M-LMS Licensees**

In 1985, the FCC opened the Part 15 902-928 MHz band to new spread spectrum and frequency hopping technologies. What was a novel approach at the time has since grown into one of the most heavily used and successful bands currently allocated by the Commission. Today, there are millions of Part 15 devices that operate in the 902-928 MHz band, including everything from baby monitors to utility smart meters. In the Commission’s words, “[a]t any time of day, most people are within a few meters of consumer products that use low-power Part 15 transmitters.”<sup>2</sup>

In 1995, a decade after expanding the uses of the 902-928 MHz band, the Commission created the current rules for operation of M-LMS devices overlapping the Part 15 band, specifically at 904–909.75 and 919.75–927.25 MHz.<sup>3</sup> Concerned with disrupting the robust innovation in and intense utilization of the 902-928 MHz band, the FCC specifically required “that LMS systems are not operated in such a manner as to degrade, obstruct or interrupt Part 15 devices to such an extent that Part 15 operations will be negatively affected.”<sup>4</sup> Wideband M-LMS operations, such as those proposed by Progeny, were of a particular concern. The Commission noted that Part 15 users “uniformly oppose” the use of wideband forward links by M-LMS operators “on the grounds that such transmissions are likely to cause interference to

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<sup>2</sup> FCC OET Bulletin NO. 63, Understanding The FCC Regulations For Low-Power, Non-Licensed Transmitters, 1 (1996).

<sup>3</sup> Amendment of Part 90 of the Commission's Rules to Adopt Regulations for Automatic Vehicle Monitoring Systems, Report and Order, PR Docket No. 93-61, 10 FCC Rcd 4695 (1995) (LMS Report and Order).

<sup>4</sup> Location and Monitoring Service Systems, Order on Reconsideration, PR Docket No. 93-61, 11 FCC Rcd 16905 at para. 25 (1996).

*Part 15 devices” and that such commenters “expressed fear of being ‘drowned out’ by high powered forward links, particularly wideband forward links.”*<sup>5</sup>

As a result of these potential interference issues, M-LMS licensees were not granted authority to commence operations upon issuance of a license, as is common in other services, but were required, prior to operation, to demonstrate through actual field tests that their proposed M-LMS systems will not cause unacceptable levels of interference to Part 15 devices in the 902-928 MHz band.<sup>6</sup> Accordingly, Progeny acquired its M-LMS licenses in 1999 on explicit notice from the Commission of its obligations to the millions of Part 15 users.

In 2006, the Commission opened a rulemaking proceeding to explore potential changes to the M-LMS service rules in order to accommodate the type of operation proposed by Progeny now. The Commission again emphasized “*the importance of maintaining the existing availability of the band for unlicensed devices, which has led to a proliferation of important public, private, and consumer applications.*”<sup>7</sup> Progeny was a full participant in that proceeding.

In 2011, the Commission granted a waiver to Progeny of two M-LMS service rules to allow it to provide a one-way location monitoring service for both vehicular and non-vehicular units.<sup>8</sup> The Commission specifically required Progeny to take steps to minimize interference with existing users, including Part 15 users. The Commission further ordered Progeny to

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<sup>5</sup> LMS Report and Order at para. 76.

<sup>6</sup> 47 C.F.R. 90.353(d).

<sup>7</sup> See Amendment of the Commission's Part 90 Rules in the 904-909.75 and 919.75-928 MHz Bands, Notice of Proposed Rulemaking, 21 FCC Rcd 2809 at para. 3 (2006).

<sup>8</sup> Notably, the Commission in its LMS Report and Order specifically disallowed non-vehicular location services to be provided by non-multilateration systems because of concerns that such operations would “cause more intensive use of the sub-band, to the detriment of [...] other users.” LMS Report and Order at para. 24.

demonstrate that its M-LMS service will not cause unacceptable levels of interference to Part 15 devices operating in the 902-928 MHz band.<sup>9</sup>

At each step of the way, the Commission carefully made Progeny aware of its obligations to Part 15 users. Despite this explicit notice from the Commission, Progeny has not met its burden to protect Part 15 devices from unacceptable interference. Instead, Progeny has repeatedly requested rule concessions from the Commission.

In light of Progeny's waiver, additional scrutiny of its proposed interference mitigation plan is appropriate. Even a cursory review, however, shows that Progeny has failed to meet its burden to demonstrate that it will not cause unacceptable interference to Part 15 users.

### **III. Progeny Has Failed To Demonstrate That Its Proposed System Will Not Cause Unacceptable Interference To Part 15 Devices In The 902-928 MHz Band**

Wireless Part 15 devices are designed using integrated circuit receiver chips that generally perform well at avoiding interference from other low power devices, but are not intended to share spectrum with high power transmitters. While Progeny's field tests focused on the effects of a limited set of Part 15 radios, there is tremendous variety in performance among vendors. Progeny's treatment of frequency hopping devices is particularly troubling. Progeny acknowledges that interference to such devices will occur, but appears to claim that such interference is not "unacceptable" because devices are able to hop to alternative frequencies within the band.

Such a claim is not supported by Progeny's test results. For example, testing would need to be conducted to determine receiver blocking effects as a function of range from Progeny's high power beacon transmitters. In addition to the on-channel interference that Part 15 radios

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<sup>9</sup> *In the Matter of Request by Progeny LMS, LLC for Waiver of Certain Multilateration Location and Monitoring Service Rules*, Order, 26 FCC Rcd 16878 (2011).

will experience from beacon signals, Part 15 devices will suffer unplanned harmful interference from Part 15 receiver blocking as a result of the high power in-band M-LMS beacons. Typical Part 15 902-928 MHz radios lack the dynamic range to tolerate such signals and will not be protected by the saw and ceramic filters used to protect them from strong out-of-band signals. As an example, a common integrated circuit radio chipset used in millions of frequency hopping Advanced Metering Infrastructure (“AMI”) smart meter devices has receiver blocking specs as low as -53dBm from signals transmitted within 10 MHz (+/- 10MHz) of the desired carrier. While this is adequate to mitigate interference from other nearby Part 15 devices, a high power signal such as the 30 Watt beacon that Progeny proposes has the potential to create receiver overload and block the receiver throughout the entire 902-928 MHz band within some distance of the beacon transmitter -- estimated at approximately .25 miles. Progeny’s beacon system is designed with many high power beacon transmitters to enable building penetration.<sup>10</sup>

The effect of such a dense deployment will render AMI smart meters and other Part 15 devices within close proximity to the high power beacon transmitter unusable. Given the millions of smart meters recently deployed in metro areas and tens of millions of other Part 15 devices deployed since 1985 the blocking effects from high power in band M-LMS beacons will be catastrophic to the performance of nearby Part 15 devices.

#### **IV. Harmful Interference to Part 15 Devices In The 902-928 MHz Band Will Have Devastating Consequences to the Public Interest**

The Commission has long recognized the tremendous success of the Part 15 bands. The National Broadband Plan, in calling for *more* spectrum for unlicensed devices, notes that the

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<sup>10</sup> In addition, Progeny’s beacon system appears to be woefully inefficient for the limited amount of data transmitted. The system requires multiple high power transmitters even if only a single user is present. The system also uses a duty cycle of up to 20% per beacon, 10 times that of the 2% duty cycle permitted under Section 15.247 for frequency hopping devices. That duty cycle apparently is synchronized additively between beacons so that the effective duty cycle in the presence of multiple beacons can be as high as 100%.

technologically flexible access to Part 15 bands “*is an essential innovation policy that the FCC should continue to develop.*”<sup>11</sup> Chairman Genachowski recently testified before the House Committee on Energy and Commerce Subcommittee on Communications and Technology that unlicensed spectrum has a record of creating “*hundreds of billions of dollars of value*” for our economy and consumers.<sup>12</sup> Commissioner Clyburn testified at the same hearing that unlicensed spectrum generates up to an estimated “*37 billion dollars each year for the U.S. economy.*”<sup>13</sup> These widespread, highly visible public interest benefits stemming from robust unlicensed operations in the 902-928 MHz band are now jeopardized by Progeny’s proposed operations.

An incredibly wide variety of devices operate in the 902-928 MHz band, including Radio Frequency Identification Devices (“RFIDs”) used for supply chain and asset management, Wireless Local Area Network (“WLAN”) transmitters that provide broadband service to millions of Americans, SCADA devices that monitor and control oil and natural gas pipelines and production fields, utility smart meters that improve grid reliability and promote conservation, equipment wayside detectors for railroads, medical devices such as wireless glucose meters and insulin pumps -- the list is endless. Recently, the 902-928 MHz band has been the home for innovations such as the ZigBee standard for Home Area Network (“HAN”) protocols, which, among other things, powers smart-grid enabled appliances that have the potential to save

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<sup>11</sup> Connecting America: The National Broadband Plan, Section 5.1 (2010).

<sup>12</sup> Keeping the New Broadband Spectrum Law on Track, Hearing before the House Committee on Energy and Commerce, Subcommittee on Communications and Technology, 112<sup>th</sup> Cong. (Dec. 12, 2012) (Testimony of Julius Genachowski, Chairman, Federal Communications Commission).

<sup>13</sup> Keeping the New Broadband Spectrum Law on Track, Hearing before the House Committee on Energy and Commerce, Subcommittee on Communications and Technology, 112<sup>th</sup> Cong. (Dec. 12, 2012) (Testimony of Mignon L. Clyburn, Commissioner, Federal Communications Commission).

Americans millions of dollars in energy costs each year. Other new technologies, offering significant public interest benefits, are undoubtedly on the drawing board.

Many of those technologies will be severely degraded in areas where Progeny's proposed M-LMS system is to be deployed. GE Digital Energy and GE MDS's study of Progeny's results reflect that many Part 15 devices are likely to suffer debilitating interference on any frequency occupied by Progeny. Progeny concedes this point in stating that the solution for such devices is to use alternate channels. In addition, there will be a significant increase to the noise floor throughout the rest of the band as Part 15 users try to migrate away from Progeny's occupied spectrum.

As serious as that is, Progeny's proposed operations present a much more dire scenario for Part 15 users. Assuming that M-LMS operations such as Progeny's are authorized to operate throughout the 904–909.75 and 919.75–927.25 MHz band, GE Digital Energy and GE MDS estimate that due to receiver overload many Part 15 band devices will suffer harmful interference throughout the entire 902-928 MHz band (even on channels that Progeny does not transmit on) within close proximity of Progeny beacons. In 2006, Progeny stated that a 30 Watt M-LMS transmitter would have a coverage radius of “slightly less than one quarter of a mile.”<sup>14</sup> To the extent that Progeny sought a waiver of the Commission's requirement to provide service primarily to vehicles because it seeks to serve indoor locations in urban areas, this distance appears to be a reasonable expectation. The impact, however, would be devastating to Part 15 users, as the entire 902-928 MHz band would effectively be blocked in certain areas served by Progeny.

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<sup>14</sup> See Amendment of the Commission's Part 90 Rules Amendment of the Commission's Part 90 Rules, Comments of Progeny LMS, LLC at 29, WT Docket No. 06-49 (May 30, 2006).



Consequently, the potential for disruption in the 902-928 MHz band raises several public policy concerns that should be fully weighed by the Commission as it considers Progeny's proposal. First, the proposed system would threaten the reliable operation of billions of dollars worth of public and private investments in AMI that utilize this band. Such an outcome would undermine national policy objectives supporting the modernization of the nation's electric grid and conflict with the Commission's prior acknowledgment of smart grid as a national priority.<sup>15</sup> Second, Progeny's proposal would jeopardize the safety and security of our nation's critical infrastructure by risking interruption of the communications networks that monitor and control wellhead and pipeline operations, utility substations and other key facilities – this at a time when the Administration is seeking to enhance security through consideration of new cyber security measures. Third, Progeny's proposal would negate the Commission's efforts to identify and open additional spectrum for unlicensed use, despite the fact that the Commission and the Congress have repeatedly recognized the contributions of unlicensed spectrum to innovation and economic growth. Despite these potential impacts to the nation's infrastructure and economy, Progeny has presented no meaningful interference mitigation techniques, nor has it met its burden of demonstrating that its proposed operations will not cause unacceptable interference to Part 15 users.

## **V. Conclusion**

Progeny's operations will be devastating to millions of devices, billions of dollars of imbedded infrastructure, and countless critical infrastructure applications successfully operating

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<sup>15</sup> See Energy Independence and Security Act of 2007 (EISA), Pub. L. No. 110-140, 121 Stat. 1492, 1783-84 (codified at 42 U.S.C. § 17381) (containing a policy statement on United States' grid modernization that defines "smart grid"). See also National Broadband Plan: Connecting America (Chapter 12: Energy and the Environment).

today in the Part 15 band. GE Digital Energy and GE MDS strongly urge the Commission *not* to approve Progeny's commencement of M-LMS operations at this time.

**Respectfully submitted,**

**GE DIGITAL ENERGY  
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